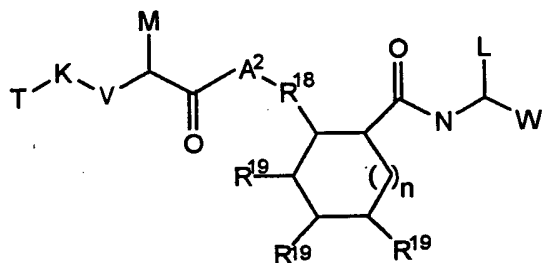


CLAIMS

What is claimed is:

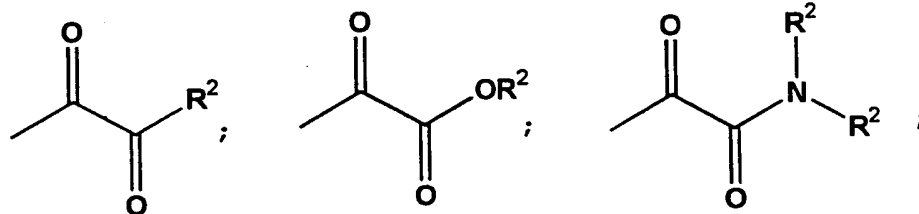
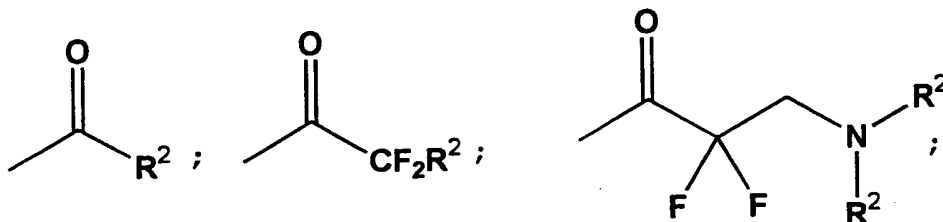
1. A compound of the formula (I):



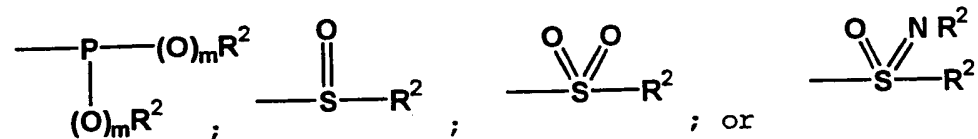
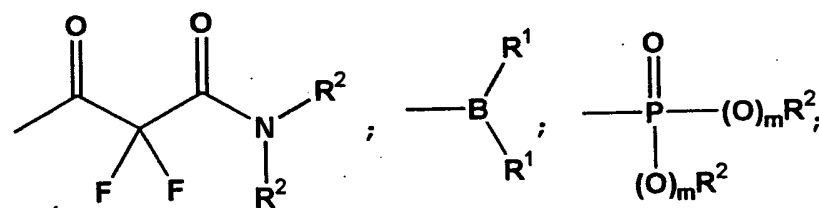
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, wherein:

W is:



15



wherein:

m is 0 or 1;

20

each  $R^1$  is hydroxy, alkoxy, or aryloxy, or each  $R^1$  is an oxygen atom and together with the boron, to which they are each bound, form a 5-7 membered ring,

wherein the ring atoms are carbon, nitrogen, or oxygen;

each  $R^2$  is independently hydrogen, alkyl, alkenyl, aryl, aralkyl, aralkenyl, cycloalkyl, cycloalkylalkyl, cycloalkenyl, cycloalkenylalkyl, heterocyclyl, heterocyclylalkyl, heterocyclylalkenyl, heteroaryl, or heteroaralkyl, or two  $R^2$  groups, which are bound to the same nitrogen atom, form together with that nitrogen atom, a 5-7 membered monocyclic heterocyclic ring system; wherein any  $R^2$  carbon atom is optionally substituted with J;

J is alkyl, aryl, aralkyl, alkoxy, aryloxy, aralkoxy, cycloalkyl, cycloalkoxy, heterocyclyl, heterocycliloxy, heterocyclylalkyl, keto, hydroxy, amino, alkylamino, alkanoylamino, aroylamino, aralkanoylamino, carboxy, carboxyalkyl, carboxamidoalkyl, halo, cyano, nitro, formyl, acyl, sulfonyl, or sulfonamido and is optionally substituted with 1-3  $J^1$  groups; and

$J^1$  is alkyl, aryl, aralkyl, alkoxy, aryloxy, heterocyclyl, heterocycliloxy, keto, hydroxy, amino, alkanoylamino, aroylamino, carboxy, carboxyalkyl, carboxamidoalkyl, halo, cyano, nitro, formyl, sulfonyl, or sulfonamido;

L is alkyl, alkenyl, or alkynyl, wherein any hydrogen is optionally substituted with halogen, and wherein any hydrogen or halogen atom bound to any terminal carbon atom is optionally substituted with sulfhydryl or hydroxy;

each M is independently alkyl, cycloalkyl, aryl, aralkyl, heterocyclyl, heterocyclylalkyl, heteroaryl, or

heteroaralkyl, and is optionally substituted by 1 to 3 J groups, wherein any alkyl carbon atom may be replaced by a heteroatom;

$R^{18}$  is a bond,  $-N(R^{11})-$ , or  $-C(O)-$ ;

5  $R^{11}$  is hydrogen or  $C_1-C_3$  alkyl;

each  $R^{19}$  is independently H or  $R^{21}$ -aryl, or 2 adjacent  $R^{19}$  may be bound to one another to form a 5-7 membered aromatic ring; wherein any  $R^{19}$  is optionally substituted with 1 to 4 independently selected J' groups;

10 each  $R^{21}$  is independently  $C_1-C_3$ -straight or branched alkyl,  $C_2-C_3$ -straight or branched alkenyl,  $O-(C_1-C_3)$ -straight or branched alkyl, or  $O-(C_2-C_3)$ -straight or branched alkenyl;

n is 0 or 1;

15 the ring to which  $R^{18}$  and  $R^{19}$  are attached may be saturated, partially saturated, aromatic or fully unsaturated; and 1 to 3 carbon atoms that make up the ring to which  $R^{18}$  and  $R^{19}$  are attached are optionally replaced with a heteroatom which is independently  
20 selected from O, S,  $S(O)$ ,  $S(O)_2$  or  $N(R^{11})$ ;

$A^2$  is a bond or  $-N(R^{11})-R^{17}(M)-R^{22}-$ , wherein

$R^{17}$  is  $-CH-$  or  $-N-$ ; and

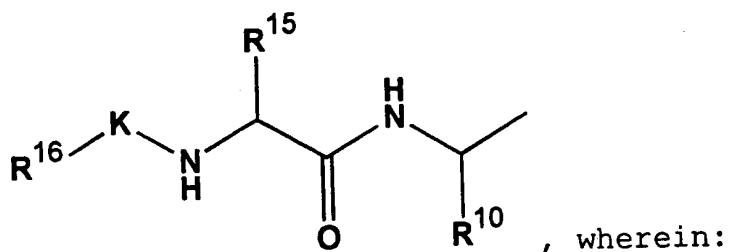
$R^{22}$  is  $-C(O)-$  or  $-S(O)_2-$ ;

V is a bond,  $-CH(R^{11})-$ ,  $-O-$ ,  $-S-$ , or  $-N(R^{11})-$ ;

25 K is a bond,  $-O-$ ,  $-S-$ ,  $-C(O)-$ ,  $-S(O)-$ ,  $-S(O)_2-$ , or -

$S(O)NR^{11}-$ ;

T is  $-R^{12}$ ,  $-alkyl-R^{12}$ ,  $-alkenyl-R^{12}$ ,  $-alkynyl-R^{12}$ ,  $-OR^{12}$ ,  $-N(R^{12})_2$ ,  $-C(O)R^{12}$ ,  $-C(=NO-alkyl)R^{12}$ , or



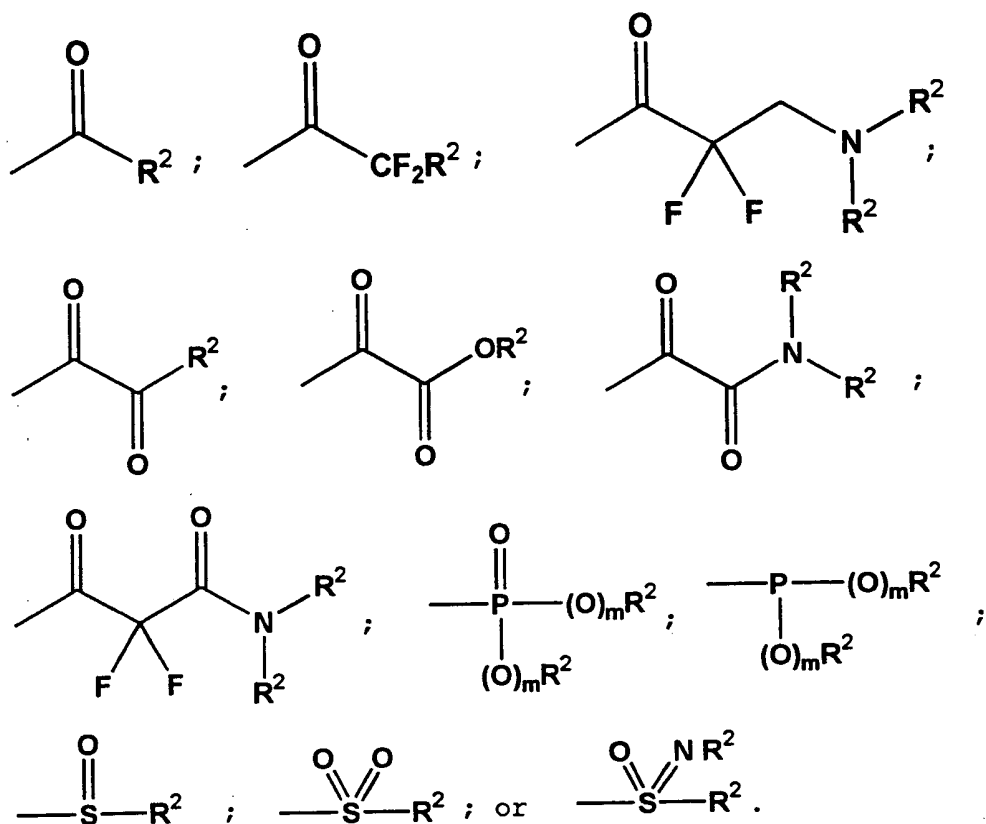
each  $R^{12}$  is independently selected from hydrogen, aryl, heteroaryl, cycloalkyl, heterocyclyl, cycloalkylidenyl, or heterocycloalkylidenyl, and is optionally substituted with 1 to 3 J groups; or a first  $R^{12}$  and a second  $R^{12}$ , together with the nitrogen to which they are bound, form a mono- or bicyclic ring system optionally substituted by 1 to 3 J groups;

$R^{10}$  is alkyl, cycloalkyl, aryl, aralkyl, heterocyclyl, heterocyclylalkyl, heteroaryl, heteroaralkyl, carboxyalkyl, or carboxamidoalkyl, and is optionally substituted with 1 to 3 hydrogens J groups;

$R^{15}$  is alkyl, cycloalkyl, aryl, aralkyl, heterocyclyl, heterocyclylalkyl, heteroaryl, heteroaralkyl, carboxyalkyl, or carboxamidoalkyl, and is optionally substituted with 1 to 3 J groups; and

$R^{16}$  is hydrogen, alkyl, aryl, heteroaryl, cycloalkyl, or heterocyclyl.

2. The compound according to claim 1, wherein W is selected from:



5

3. The compound according to claim 2, wherein W is  $-\text{C}(\text{O})\text{H}$ .

4. The compound according to claim 1, wherein J is selected from alkyl, alkoxy, aryloxy, aryl, aralkyl, aralkoxy, halo, heteroaryl, cyano, amino, nitro, heterocyclyl, acyl, carboxy, carboxyalkyl, alkylamino, hydroxy, heterocyclylalkyl, aralkanoylamino, aroylamino, alkanoylamino, formyl or keto.

15

5. The compound according to claim 4, wherein J is selected from t-butyl, methyl, trifluoromethyl, hydroxy, methoxy, ethoxy, trifluoromethoxy, carboxy, phenyl, benzyl, phenoxy, benzyloxy, fluoro, chloro, bromo, isoxazolyl, pyridinyl, piperidinyl, carboxymethyl, carboxyethyl, dialkylamino, morpholinylmethyl,

20

phenylacetyl amino, or acyl amino.

6. The compound according to claim 1, wherein each  $J^1$  is independently selected from alkoxy, alkyl, halo  
5 or aryl.

7. The compound according to claim 6, wherein each  $J^1$  is independently selected from  $C_{1-3}$  alkoxy, chloro,  $C_{1-3}$  alkyl, or phenyl.

10 8. The compound according to claim 1, wherein L is selected from trihalomethyl, sulfhydryl or alkyl substituted with trihalomethyl, sulfhydryl, or hydroxy.

9. The compound according to claim 8, wherein  
15 L is  $-CH_2CH_3$  or  $-CH_2CF_3$ .

10. The compound according to claim 1, wherein  $R^2$  is selected from H, fluorine, trifluoromethyl, alkyl, aryl, aralkyl, heteroaralkyl, heterocyclyl, or  
20 heterocyclylalkyl.

11. The compound according to claim 10, wherein  $R^2$  is H.

25 12. The compound according to claim 1, wherein each M is independently selected from isopropyl, propyl, methyl, pyridylmethyl, benzyl, naphthylmethyl, phenyl, imidazolylmethyl, thiophenylmethyl, cyclohexylmethyl, phenethyl, benzylthiomethyl, or benzyloxyethyl.

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13. The compound according to claim 12, wherein each M is isopropyl.

14. The compound according to claim 1, wherein  
one  $R^{19}$  is  $R^{21}$ -aryl and the other two  $R^{19}$  are H, or two  $R^{19}$   
are bound together to form an aromatic ring and the other  
5  $R^{19}$  is H.

15. The compound according to claim 14,  
wherein one  $R^{19}$  is  $-O-(C_1-C_3)$ -alkyl-aryl.

10

16. The compound according to claim 15,  
wherein 14, wherein one  $R^{19}$  is  $-O$ -benzyl.

17. The compound according to claim 14,  
15 wherein the two  $R^{19}$  that are bound together form a 6-  
membered aromatic ring.

18. The compound according to claim 17,  
wherein the two  $R^{19}$  that are bound together form phenyl.

20

19. The compound according to claim 1, wherein  
 $R^{18}$  is  $-N(R^{11})-$ .

20. The compound according to claim 19,  
25 wherein  $R^{18}$  is  $-N(H)-$  or  $-N(CH_3)-$ .

21. The compound according to claim 1, wherein  
 $A^2$  is a bond or  $-N(R^{11})-C(M)-C(O)-$ .

30

22. The compound according to claim 21,  
wherein  $A^2$  is a bond or  $-N(H)-C(M)-C(O)-$ , wherein M is  
isopropyl.

23. The compound according to claim 1, wherein V is  $-N(R^{11})-$ .

5            24. The compound according to claim 23, wherein V is  $-NH-$ .

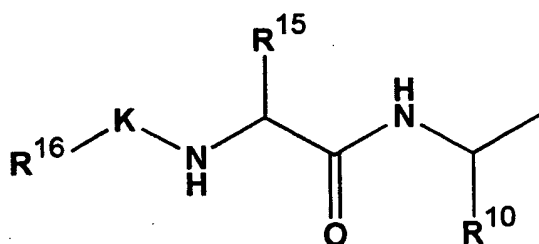
25. The compound according to claim 1, wherein K is  $-C(O)-$  or  $-S(O)_2-$ .

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26. The compound according to claim 25, wherein K is  $-C(O)-$ .

27. The compound according to claim 1, wherein T is selected from  $-R^{12}$ ,  $-alkyl-R^{12}$ ,  $-alkenyl-R^{12}$ ,  $-OR^{12}$ ,  $-N(R^{12})_2$ ,  $-C(=NO-alkyl)-R^{12}$ , or

15



28. The compound according to claim 27, wherein T is  $-R^{12}$  or  $-alkyl-R^{12}$ .

20

29. The compound according to claim 1, wherein  $R^{12}$  is aryl or heteroaryl and is optionally substituted by 1-3 J groups.

25

30. The compound according to claim 29, wherein  $R^{12}$  is naphthyl, pyrazinyl, or pyridyl, any of

which is optionally substituted with a hydroxy group.

31. The compound according to claim 1, wherein  $R^{10}$  is alkyl substituted with carboxy.

5

32. The compound according to claim 1, wherein  $R^{15}$  is alkyl substituted with carboxy.

10 33. The compound according to claim 1, wherein the ring to which  $R^{18}$  and  $R^{19}$  are attached is aromatic.

34. A pharmaceutically acceptable composition comprising:

15 a) a compound according to any one of claims 1-33 in an amount effective to inhibit HCV NS3 protease; and

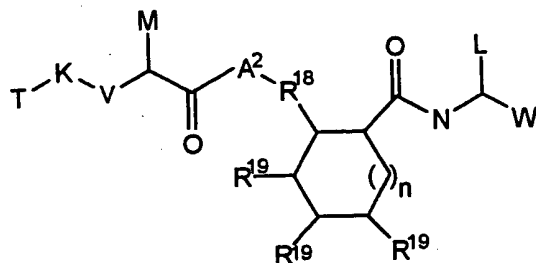
b) a pharmaceutically suitable carrier.

20 35. The use of a compound according to any one of claims 1-33 or a pharmaceutical composition according to claim 34 in the manufacture of a medicament for inhibiting serine protease activity in a patient.

36. The use according to claim 35, wherein the serine protease is HCV NS3 protease.

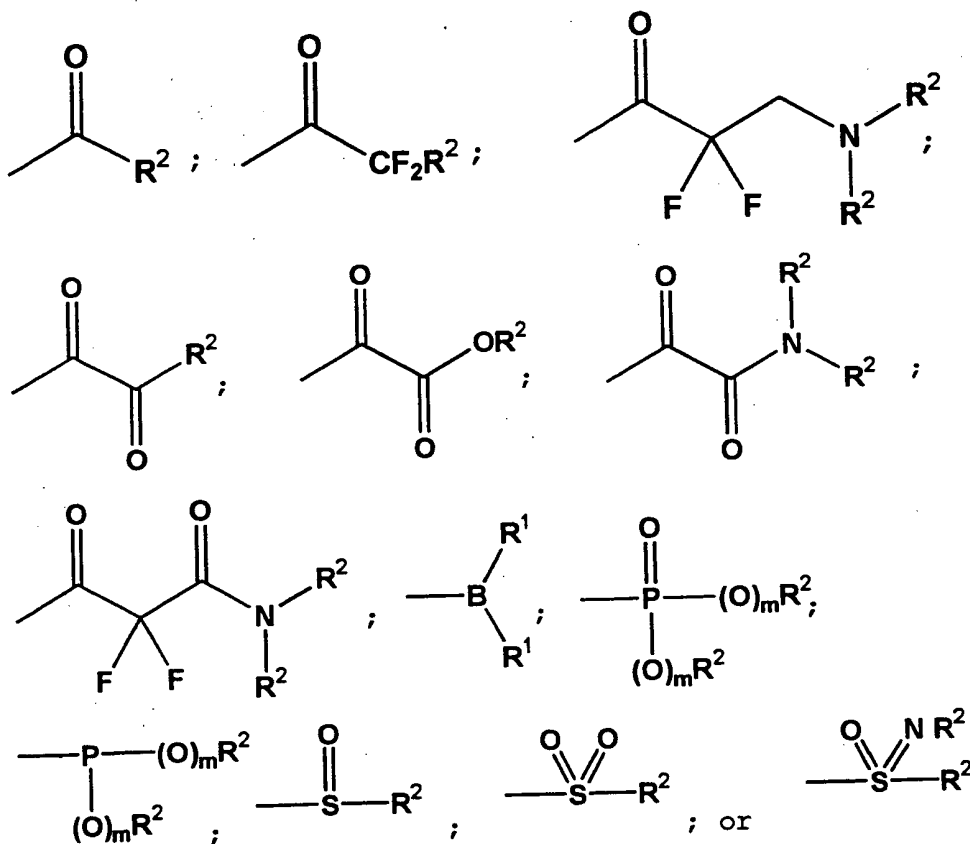
25 37. The use of a compound according to any one of claims 1-33 or a pharmaceutical composition according to claim 34 in the manufacture of a medicament for treating or preventing a hepatitis C viral infection in a patient.

38. A process for preparing a compound of the formula (I):



, wherein:

W is:



wherein:

m is 0 or 1;

each  $R^1$  is hydroxy, alkoxy, or aryloxy, or each  $R^1$  is an oxygen atom and together with the boron, to which they are each bound, form a 5-7 membered ring,

wherein the ring atoms are carbon, nitrogen, or oxygen;

each  $R^2$  is independently hydrogen, alkyl, alkenyl, aryl, aralkyl, aralkenyl, cycloalkyl, cycloalkylalkyl, cycloalkenyl, cycloalkenylalkyl, heterocyclyl, heterocyclylalkyl, heterocyclylalkenyl, heteroaryl, or heteroaralkyl, or two  $R^2$  groups, which are bound to the same nitrogen atom, form together with that nitrogen atom, a 5-7 membered monocyclic heterocyclic ring system; wherein any  $R^2$  carbon atom is optionally substituted with J;

J is alkyl, aryl, aralkyl, alkoxy, aryloxy, aralkoxy, cycloalkyl, cycloalkoxy, heterocyclyl, heterocycllyoxy, heterocyclylalkyl, keto, hydroxy, amino, alkylamino, alkanoylamino, aroylamino, aralkanoylamino, carboxy, carboxyalkyl, carboxamidoalkyl, halo, cyano, nitro, formyl, acyl, sulfonyl, or sulfonamido and is optionally substituted with 1-3  $J^1$  groups; and

$J^1$  is alkyl, aryl, aralkyl, alkoxy, aryloxy, heterocyclyl, heterocycllyoxy, keto, hydroxy, amino, alkanoylamino, aroylamino, carboxy, carboxyalkyl, carboxamidoalkyl, halo, cyano, nitro, formyl, sulfonyl, or sulfonamido;

L is alkyl, alkenyl, or alkynyl, wherein any hydrogen is optionally substituted with halogen, and wherein any hydrogen or halogen atom bound to any terminal carbon atom is optionally substituted with sulfhydryl or hydroxy;

each M is independently alkyl, cycloalkyl, aryl, aralkyl, heterocyclyl, heterocyclylalkyl, heteroaryl, or

heteroaralkyl, and is optionally substituted by 1 to 3 J groups, wherein any alkyl carbon atom may be replaced by a heteroatom;

$R^{18}$  is a bond,  $-N(R^{11})-$ , or  $-C(O)-$ ;

5  $R^{11}$  is hydrogen or  $C_1-C_3$  alkyl;

each  $R^{19}$  is independently H or  $R^{21}$ -aryl, or 2 adjacent  $R^{19}$  may be bound to one another to form a 5-7 membered aromatic ring; wherein any  $R^{19}$  is optionally substituted with 1 to 4 independently selected J' groups;

10 each  $R^{21}$  is independently  $C_1-C_3$ -straight or branched alkyl,  $C_2-C_3$ -straight or branched alkenyl,  $O-(C_1-C_3)$ -straight or branched alkyl, or  $O-(C_2-C_3)$ -straight or branched alkenyl;

n is 0 or 1;

15 the ring to which  $R^{18}$  and  $R^{19}$  are attached may be saturated, partially saturated, aromatic or fully unsaturated; and 1 to 3 carbon atoms that make up the ring to which  $R^{18}$  and  $R^{19}$  are attached are optionally replaced with a heteroatom which is independently

20 selected from O, S,  $S(O)$ ,  $S(O)_2$  or  $N(R^{11})$ ;

$A^2$  is a bond or  $-N(R^{11})-R^{17}(M)-R^{22}-$ , wherein

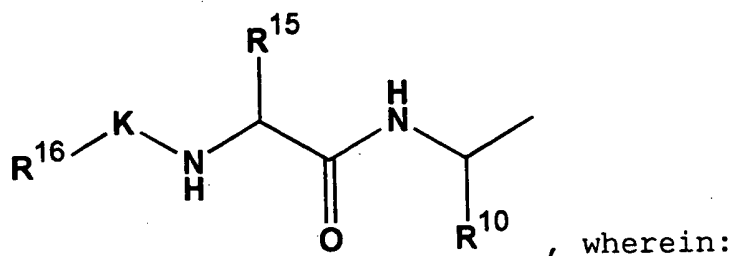
$R^{17}$  is  $-CH-$  or  $-N-$ ; and

$R^{22}$  is  $-C(O)-$  or  $-S(O)_2-$ ;

V is a bond,  $-CH(R^{11})-$ ,  $-O-$ ,  $-S-$ , or  $-N(R^{11})-$ ;

25 K is a bond,  $-O-$ ,  $-S-$ ,  $-C(O)-$ ,  $-S(O)-$ ,  $-S(O)_2-$ , or  $-S(O)NR^{11}-$ ;

T is  $-R^{12}$ ,  $-alkyl-R^{12}$ ,  $-alkenyl-R^{12}$ ,  $-alkynyl-R^{12}$ ,  $-OR^{12}$ ,  $-N(R^{12})_2$ ,  $-C(O)R^{12}$ ,  $-C(=NO-alkyl)R^{12}$ , or



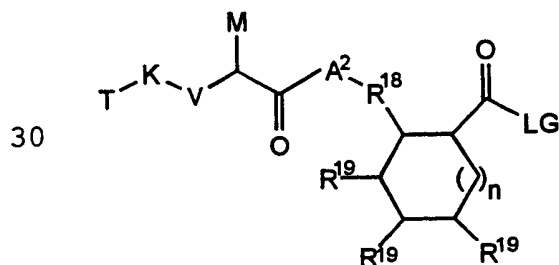
each  $R^{12}$  is independently selected from hydrogen, aryl, heteroaryl, cycloalkyl, heterocyclyl, cycloalkylidenyl, or heterocycloalkylidenyl, and is optionally substituted with 1 to 3 J groups; or a first  $R^{12}$  and a second  $R^{12}$ , together with the nitrogen to which they are bound, form a mono- or bicyclic ring system optionally substituted by 1 to 3 J groups;

$R^{10}$  is alkyl, cycloalkyl, aryl, aralkyl, heterocyclyl, heterocyclylalkyl, heteroaryl, heteroaralkyl, carboxyalkyl, or carboxamidoalkyl, and is optionally substituted with 1 to 3 hydrogens J groups;

$R^{15}$  is alkyl, cycloalkyl, aryl, aralkyl, heterocyclyl, heterocyclylalkyl, heteroaryl, heteroaralkyl, carboxyalkyl, or carboxamidoalkyl, and is optionally substituted with 1 to 3 J groups; and

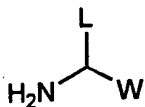
$R^{16}$  is hydrogen, alkyl, aryl, heteroaryl, cycloalkyl, or heterocyclyl; comprising the step of:

reacting a compound of formula (II):



, wherein LG is OH or an appropriate leaving group and the other substituents are as defined above;

- 5 with a compound of formula (III):



, wherein the NH<sub>2</sub> group is optionally protected and L and W are as defined above;

- 15 in the presence of a coupling reagent, provided that the compound of formula (II) or the compound of formula (III) is optionally bound to a resin.